



# T0060-P Dynamic and Static Behavior of a Flexible Fuel Hose in Zero-G

## Problem Statement

- Flexible fuel hoses are in the design for on-orbit satellite refueling operations.
- These have inner corrugated tubes that are torsionally stiff. Improper handling can result in force-torque buildup or breakage.
- A flight will verify if our handling measure (to prevent these negative results) are correct.
- This information is useful to future space missions that need to be refueled or serviced.

## Technology Development Team

- Dr. Edward Cheung. Jackson and Tull/GSFC  
edward.b.cheung@nasa.gov.
- NASA/GSFC Code 408  
Satellite Servicing Capabilities Office
- NASA/KSC Team 541638  
Satellite Refueling Office

## Proposed Flight Experiment

### Experiment Readiness:

- Readiness for flight in January 2013

### Test Vehicles:

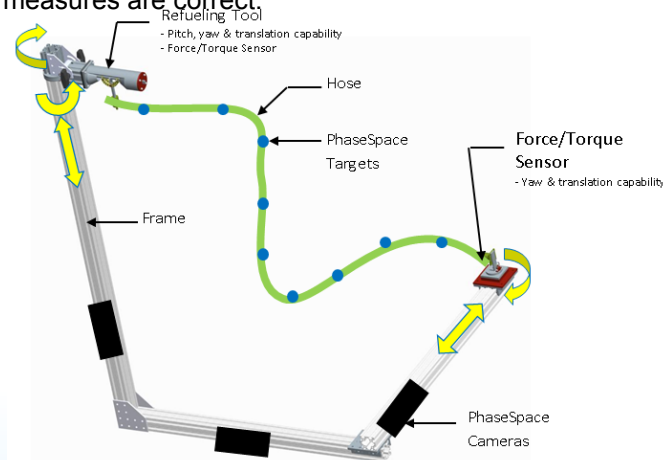
- Parabolic aircraft

### Test Environment:

- This is the first parabolic flight for this hardware. A subset (different sensors) will be tested in a neutral buoyancy tank.

### Test Apparatus Description:

- A section of flexible hose (green) will be flown and attached into a holding fixture and tested for static and dynamic forces to understand if our handling measures are correct.



## Technology Maturation

- To mature to TRL 5, a parabolic flight is needed, which validates our handling procedures. We then use an end-end lab test to mature to TRL 6.
- The Parabolic flight is expected to occur in the Spring/Summer of 2013, and the lab test in Fall 2013.

## Objectives of Proposed Experiment

- To measure the steady state forces and torques at the hose endpoints.
- To gather data to correlate a dynamical model of the hose.
- A force-torque sensor will be used for the static data, and a three-dimensional motion capture system will be used for the hose shape capture.

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